

## **HYDRAULIC IMPULSE GENERATOR AND FREQUENCY SWEEP MECHANISM FOR BOREHOLE APPLICATIONS**

### **Abstract of the Disclosure**

This invention discloses a valve that generates a hydraulic negative  
5 pressure pulse and a frequency modulator for the creation of a powerful,  
broadband swept impulse seismic signal at the drill bit during drilling operations.  
The signal can be received at monitoring points on the surface or underground  
locations using geophones. The time required for the seismic signal to travel from  
the source to the receiver directly and via reflections is used to calculate seismic  
10 velocity and other formation properties near the source and between the source  
and receiver. This information can be used for vertical seismic profiling of  
formations drilled, to check the location of the bit, or to detect the presence of  
abnormal pore pressure ahead of the bit. The hydraulic negative pressure pulse  
can also be used to enhance drilling and production of wells.